

Code No: R17A0326

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Supplementary Examinations, April 2023

Power Plant Engineering

(ME)

Roll No										
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1 *A* How does a Modified Rankine Cycle differ from a Rankine Cycle? Write also the expression of modified Rankine efficiency. [6M]
- B* Define Condenser? Describe the operation of [4M]
- (a) Surface condenser [4M]
- (b) Jet condenser with neat diagram.

OR

- 2 *A* Name the different types of coal transferring equipments. Discuss in detail about any two coal transferring equipments with neat sketches. [8M]
- B* Write the short notes on the following:
- (a) Supercharged boiler [3M]
- (b) Supercritical boiler. [3M]

SECTION-II

- 3 *A* State the advantages of operating the Gas power plants combined in Electric power system. [6M]
- B* Explain with the help of T-s chart and line diagram the working of Gas turbine plant. How can be efficiency of the plant be improved? [8M]

OR

- 4 *A* List the essential components of a Diesel power plant and explain briefly. [6M]
- B* Describe with neat sketch the working of a simple constant pressure open cycle diagram along with T-s and P-v diagram in gas turbine power plant? [8M]

SECTION-III

- 5 *A* Draw a neat diagram of CANDU type reactor and explain its working principle and give its advantage over the other types. [10M]
- B* Discuss the safety measures which are provided at a nuclear power plant. [4M]

OR

- 6 *A* Describe with the help of a neat sketch the construction working of Boiling Water Reactor (BWR)? [10M]
- B* What are the different types of nuclear waste? Which are more dangerous and why? [4M]

coil and the by-pass factor.

SECTION-IV

- 7 A building has U-value of $0.5 \text{ W/m}^2\text{K}$ and total exposed surface area of 384 m^2 . The building is subjected to an external load (only sensible) of 2 kW and an internal load of 1.2 kW (sensible). If the required internal temperature is 25°C , state whether a cooling system is required or heating system is required when the external temperature is 3°C . How the result will change, if the U-value of the building is reduced to 0.36 W/m K ? [14M]

OR

- 8 *A* Write about the steps in cooling load calculations? [7M]
B Explain about the ventilation systems standards? [7M]

SECTION-V

- 9 Write about the types , characteristics and applications of fans in a detail [14M]

OR

- 10 *A* Write about different types of valves used in HVAC piping system? [7M]
B Explain the Classification of water piping system? [7M]

Code No: R17A0328

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Supplementary Examinations, April 2023

Mechanical Measurements and Instrumentation

(ME)

Roll No										

Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1 *A* Discuss the functional elements of the measuring Instruments with example. [7M]
 B Explain the working of LVDT with a neat sketch. [7M]

OR

- 2 *A* Discuss the working of Inductive Transducer with a neat sketch. [7M]
 B Discuss the dynamic performance characteristics of measuring instruments. [7M]

SECTION-II

- 3 *A* Explain electrical resistance thermometer with a neat sketch. [7M]
 B List out different types of manometers and explain the working of inclined tube manometer. [7M]

OR

- 4 *A* A McLeod pressure gauge has volume bulb $V = 100 \times 10^6 \text{ m}^3$ and measuring capillary diameter of 1mm. calculate the pressure indicated when the reading of the measuring capacity is 30 mm in case approximate formula is used. What is the error if the exact formula is used for measurement of pressure? [7M]
 B Explain the working of a pyrometer with a neat sketch. [7M]

SECTION-III

- 5 *A* Describe the construction and working of a Turbine flow meter. [7M]
 B Explain the construction and working of an A.C tachometer generator. [7M]

OR

- 6 *A* Describe the working of Ultrasonic flow meter. [7M]
 B Explain the construction, working of a photoelectric tachometer. [7M]

SECTION-IV

- 7 *A* Explain the working of Delta type strain gauge rosettes. [7M]
 B Discuss how relative humidity can be determined by measuring Dew point temperature. [7M]

OR

- 8 *A* Explain the working of Rectangular strain gauge rosettes. [7M]
 B Discuss the method used for measurement of moisture content in gases. [7M]

SECTION-V

- 9 *A* What are proving rings? Explain how they can be used for measurement of force. [7M]
 B Explain about Torsionmeter in detail. [7M]

OR

- 10 *A* Discuss open loop control system for an application with a block diagram. [7M]
 B Discuss a closed system servomechanism with a suitable example. [7M]

Code No: R17A0333

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Supplementary Examinations, April 2023

Operations Research

(ME)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1 The manager of an oil refinery must decide on the optimal mix of two possible blending processes of which the input and output per production run are given as follows: [14M]

Process (units)	Input (units)		Output	
	Crude A	Crude B	Gasoline X	Gasoline Y
1	5	3	5	8
2	4	5	4	4

The maximum amount available of crude A and B are 200 units and 150 units, respectively. Market requirements show that at least 100 units of gasoline X and 80 units of gasoline Y must be produced. The profit per production run from process 1 and process 2 are Rs 300 and Rs 400, respectively. Formulate this problem as an LP model to maximize profit.

OR

- 2 A Enumerate the few applications of linear programming. [7M]
B Use the graphical method to solve the following LP problem. [7M]

Minimize $Z = 3x_1 + 2x_2$

subject to :

$$5x_1 + x_2 \geq 10$$

$$x_1 + x_2 \geq 6$$

$$x_1 + 4x_2 \geq 12$$

$$x_1, x_2 \geq 0$$

SECTION-II

- 3 A product is manufactured at four factories A, B, C and D. The unit production costs in them are Rs 2, Rs 3, Rs 1 and Rs 5, respectively. Their production capacities are 50, 70, 30 and 50 units, respectively. These factories supply the product to four stores, demands of which are 25, 35, 105, and 20 units respectively. Unit transportation cost in rupees from each factory to each store is given in the table below. [14M]

Factories	stores			
		I	II	III
A	2	4	6	11
B	10	8	7	5
C	13	3	9	12
D	4	6	8	3

Determine the extent of deliveries from each of the factories to each of the stores so that the total production and transportation cost is minimum.

OR

- 4 A salesman has to visit five cities A, B, C, D and E. The distances (in hundred km) between the five cities are as follows: [14M]

		To City				
		A	B	C	D	E
From city	A	-	17	16	18	14
	B	17	-	18	15	16
	C	16	18	-	19	17
	D	18	15	19	-	18
	E	14	16	17	18	-

If the salesman starts from city A and has to come back to city A, which route should he select so that total distance travelled by him is minimized?

SECTION-III

- 5 Use the graphical method for solving the following game and find the value of the game. [14M]

		Player B			
Player A		B1	B2	B3	B4
A1		2	2	3	-2
A2		4	3	2	6

OR

- 6 A What are the assumptions made in theory of games? [7M]
 B For the game with payoff matrix: [7M]

		Player B		
Player A		B1	B2	B3
A1		-1	2	-2
A2		6	4	-6

Determine the optimal strategies for player A and B. Also determine the value of game. Is this game (i) Fair? (ii) Strictly determinable.

SECTION-IV

- 7 The cost of a new machine is Rs 5,000. The maintenance cost of n^{th} year is given by $C_n=500(n-1)$; $n=1, 2, \dots$. Assuming that the money value will not change with time. After how many years will it be economical to replace the machine by new one? Suppose that the money is worth 5% per year, after how many years will it be economical to replace the machine by new one? [14M]

OR

- 8 Find the optimal order quantity for a product for which the price discounts are as follows: [14M]

Order quantity	unit price (Rs)
$0 \leq q < 500$	10.00
$500 \leq q < 750$	9.25

$$750 \leq q \quad 8.75$$

The monthly demand for the product is 200 units, storage cost is 2% of unit cost and cost of ordering is Rs.100.

SECTION-V

- 9 We have six jobs, each of which must go through machines A, B and C in the order ABC. Processing time (in hours) are given in the following table: [14M]

Job : 1 2 3 4 5 6

Machine A : 8 3 7 2 5 1

Machine B : 3 4 5 2 1 6

Machine C : 8 7 6 9 10 9

Determine a sequence for the five jobs that will minimize the elapsed time, idle time on machine A, B and C.

OR

- 10 Simulate the waiting line with mean arrival rate of 6 minutes and mean service rate of 5 minutes. The probability distribution for arrival and service time is observed to follow the following pattern. [14M]

Arrival time (Min.)	3	4	5	6	7	8
Probability	0.02	0.2	0.4	0.3	0.1	0.08
Service time (Min.)	3	4	5	6	7	
Probability	0.1	0.2	0.4	0.28	0.02	

Code No: R17A0329

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY **R17**
(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Supplementary Examinations, April 2023

Production and Operations Management

(ME)

Roll No										
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1 A Explain about need of production and operational management. [7M]
B What is process planning? State the functions of process planning. [7M]

OR

- 2 A Describe the functions of production planning and control in brief. [7M]
B Explain about life cycle approach to a production system. [7M]

SECTION-II

- 3 A What are the most common approaches for plant layout? Compare. [7M]
B What is process layout? Discuss the merits and demerits of process layout. [7M]

OR

- 4 A Explain the necessity of Maintenance Management. [7M]
B Describe the various elements of preventive maintenance. [7M]

SECTION-III

- 5 A What are the commonly used qualitative forecasting techniques? Explain. [7M]
B List and explain the types of forecasting in decision making. [7M]

OR

- 6 A What is a time series analysis? Explain its advantages and limitations. [7M]
B What are the common measures of forecast error? Explain. [7M]

SECTION-IV

- 7 A Explain the various steps involved in working of MRP. [7M]
B Describe the various outputs of MRP system. [7M]

OR

- 8 A What are the common difficulties in selection an ERP solution? Explain the approaches to select ERP. [7M]
B State the benefits and applications of ERP. [7M]

SECTION-V

- 9 A What is stores management? State its objectives. [7M]
B Name and explain various categories of stores. [7M]

OR

- 10 A Describe the relationship between plant layout and material handling equipments. [7M]
B Sketch any two types of conveyors, state their specific uses. [7M]

Code No: R17A0329

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Supplementary Examinations, Dec-21/Jan-22

Production and Operations Management

(ME)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1 What is production management? What is operations management? Bring out the difference between two? [14M]

OR

- 2 Discuss the role of Operation Management and its function. [14M]

SECTION-II

- 3 Explain about Master Production Schedule (MPS) and Operation schedule and its Objectives? [14M]

OR

- 4 Define plant layout. Explain different types of plant layout with advantages and limitations in detail? [14M]

SECTION-III

- 5 (a) Define Forecast. Explain different types of forecast and their uses? [7M]

- (b) What are mostly used forecasting methods used in Operation Management? [7M]

OR

- 6 Discuss briefly about forecasting Techniques. [14M]

SECTION-IV

- 7 What is Material Requirements Planning (MRP) and explain the Steps involved in Material Requirements Planning (MRP)? [14M]

OR

- 8 (a) Briefly explain about Objectives of Material Requirement Planning. [7M]

- (b) Briefly explain about Functions of Material Requirement Planning. [7M]

SECTION-V

- 9 Brief discussion on functions of stores and its objectives? [14M]

OR

- 10 What are the factors to be considered while selecting material handling system and devices? [14M]

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Supplementary Examinations, Dec-21/Jan-22

Automation and Control Engineering

(ME)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1 a) Define automation? Classify different types of automation and discuss the important reasons for automation [7M]
b) draw the simple block diagram of hydraulic circuit and discuss it briefly [7M]
- OR

- 2 a) Discuss various types of automation strategies mentioning their importance [7M]
b) Differentiate between flexible automation and fixed automation and mention their advantages and limitations [7M]

SECTION-II

- 3 a) Explain about characteristics of Sensors [7M]
b) Explain with neat sketch of LVDT sensor [7M]
- OR

- 4 a) Explain with neat sketch of pneumatic sensor [7M]
b) Explain with neat sketch of thermocouple circuit [7M]

SECTION-III

- 5 a) with neat sketch explain the speed control by pump volume for a pneumatic actuator [7M]
b) Explain difference between electro-pneumatic, hydro-pneumatic and electro-hydraulic servo systems [7M]
- OR

- 6 a) What are the safety measures when using pneumatic control system? Explain [7M]
b) Using a simple circuit, explain the basic components required for a hydraulic actuation system. [7M]

SECTION-IV

- 7 a) Define control system? And write basic functions of control system [7M]
b) explain about open loop control system and write its advantages and disadvantages [7M]
- OR

- 8 a) Explain Basic terminologies in control system [7M]
b) Explain closed loop control system and write its advantages and disadvantages [7M]

SECTION-V

- 9** Explain the following:
- i) ON-OFF controller [3M]
 - ii) proportional controller [4M]
 - iii) Adding derivative controller [4M]
 - iv) Integral controller [3M]
- OR
- 10** Explain briefly about P-I, PD and P-I-D controllers? [14M]

Code No: R17A0331

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Supplementary Examinations, Dec-21/Jan-22

Heating, Ventilation and Air Conditioning

(ME)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

Note: Psychrometric charts and steam tables are permitted

SECTION-I

- 1 a) Describe the mechanism of a simple vapour compression refrigeration system [7M]
b) Establish how an actual cycle differs from a theoretical vapour compression cycle [7M]

OR

- 2 a) A single stage reciprocating compressor is required to compress 1.5m³/min of vapour refrigerant from 1 bar to 8bar. Find the power required to drive the compressor, if the compression of refrigerant is i) isothermal ii) polytropic with polytropic index as 1.12; iii) isentropic with isentropic index as 1.31 [7M]
b) To find out work done by reciprocating compressor with clearance volume? [7M]

SECTION-II

- 3 a) Explain with neat sketch of construction and working of Window-air conditioning [7M]
b) Explain the working of split A/C system with neat diagram [7M]

OR

- 4 a) Describe briefly about variable refrigerant volume and variable refrigerant flow [7M]
b) Write industrial applications of Ductable air conditioning system [7M]

SECTION-III

- 5 Discuss about psychrometric relations with neat diagrams [14M]

OR

- 6 The readings from a sling psychrometer are as follows: [14M]
Dry bulb temperature = 30°C; Wet bulb temperature = 20°C; Barometer reading = 740mm of Hg. Using steam tables, determine: i) Dew point temperature ii) Relative humidity; iii) Specific humidity; iv) Degree of saturation; v) Vapour density vi) Enthalpy of mixture per kg of dry air

SECTION-IV

- 7 a) Describe the various factors affecting survey of building [7M]
b) Explain Ventilation requirement of IAQ? [7M]

OR

- 8 a) For an office building in a city having a calculated heating load of 940kW, estimate the weight of steam required during the heating season for which the number of degree-days are 3413. The design outside and inside temperature are [7M]

17⁰C and 21⁰C respectively.

b) Explain about ventilation system standards?

[7M]

SECTION-V

9 a) Explain different types of fans and blowers

[7M]

b) Write about different types of valves used in HVAC piping system?

[7M]

OR

10 a) Discuss about the fittings used in HVAC piping System?

[7M]

b) Describe about hydronic system

[7M]

Roll No									
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Time: 3 hours**Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

1 Briefly explain about performance characteristics of measuring instrument? [14M]

OR

2 a) Explain the working principle, construction characteristics of Linear Variable Differential Transformer (LVDT). [7M]

b) Differentiate between active and passive transducers with examples. [7M]

SECTION-II

3 a) Explain the working principle of diaphragm gauge with a neat diagram. [7M]

b) State the advantages and disadvantages of diaphragm gauge. [7M]

OR

4 a) Explain the temperature measurement by thermocouples. [7M]

b) Explain the temperature measurement by resistance comprehension thermometers [7M]

SECTION-III

5 a) Explain the working of different mechanical tachometers. [7M]

b) Explain the working of proving ring used for force measurement. [7M]

OR

6 Explain in detail with neat sketches:

a) Bubbler level indicator [5M]

b) Ultrasonic level method [4M]

c) Capacitive level method [5M]

SECTION-IV

7 A 200 Ω strain gauge is bonded to a steel bar which is subjected to a tensile load. Cross-sectional area of the bar is $0.8 \times 10^{-4} \text{ m}^2$ and $E = 200 \text{ GN/m}^2$. Determine the gauge factor of the gauge. [14M]

OR

8 a) Explain the working of dew point meter. [7M]

b) Explain the working principle of torsion meter. [7M]

SECTION-V

9 What is a servomechanism? Describe the features of a servomechanism. [14M]

OR

10 a) What are the requirements of a control system? [7M]

b) Describe the operation of a driver driving an automobile on the road and identify the components, input and output of the human system. [7M]

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY **R17** **GY**
(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Supplementary Examinations, Dec-21/Jan-22
Operations Research

(ME)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

**

SECTION-I

- 1 a) What are the different types of models used in operations research? Mention general methods of solving operations research models [7M]
b) Explain the characteristics features of operation research [7M]
OR

- 2 a) A firm manufactures two products in three departments. Product A contributes Rs.5/-/unit and requires 5hrs.in dept. M, 5hrs. In dept.N and one hour in dept.P.product B contributes Rs.10/- unit and requires 8hrs. In dept. M, 3hrs in dept N and 8hrs in dept.P. Capacities for departments M, N, P are 48 hours per week. Find out optimal product mix using simplex model [10M]
b) Discuss applications of LPP [4M]

SECTION-II

- 3 Consider the following transportation problem [14M]

Source	Destination				Total
	D ₁	D ₂	D ₃	D ₄	
O ₁	1	2	1	4	30
O ₂	3	3	2	1	50
O ₃	4	2	5	9	20
Total	20	40	30	10	100

Determine the initial feasible solution

OR

- 4 a) When does degeneracy occur in TP? [7M]
b) What are the differences between general LPP and TP? [7M]

SECTION-III

- 5 a) Children Srija and Himaja play a game who have some 25 Paisa coins and 50 paisa coins. Each draw a coin from their bags without knowing other's choice. If the sum of coins drawn by both is even Srija wins them, otherwise Himaja wins. Find the best strategy for each player and also find the value of the game. [7M]
b) Explain (i) strategy (ii) pay off matrix (iii) saddle points [7M]

OR

- 6 a) Explain the graphical method of solving $2 \times n$ games and $m \times 2$ games. [7M]
b) A and B play a game in which each has three coins a 5P, a 10P, a 20P. Each selects a coin without the knowledge of the other choice. If the sum of the coins is

an odd amount, A wins B's coins. If the sum is even B wins A's coins. Find the best strategy for each player and the value of the game.

SECTION-IV

- 7 A company uses 10000 units per year of an item. The purchase price is Rs. 1 per item, ordering cost is Rs.25 per order. Carrying cost per year is 12% of the inventory value. Find: **[14M]**
- (i) The EOQ
 (ii) The number of orders per year.
 (iii) If the lead- time is 4 weeks and assuming 50 working weeks per year, find the reorder point.

OR

- 8 a)An automobile company uses 6000 pistons per year. The company can manufacture the pistons at the rate of 36000 units per year with a set-up cost of Rs.2000. The cost of holding inventory per year is estimated to be Rs.8/- per unit and unit cost is Rs.40.If the company has a provision to allow shortage at the cost of Rs.20 per unit per year, find (i) optimal size,(ii)No. of shortages (iii)manufacturing time (iv) time between set-ups. **[7M]**
- b)what are the advantages of having inventory **[7M]**

SECTION-V

- 9 Solve the following sequence problem given optimal solution when passing is not allowed **[14M]**

MACHINES	JOBS				
	A	B	C	D	E
M1	11	13	9	16	17
M2	4	3	5	2	6
M3	6	7	5	8	4
M4	15	8	13	9	11

OR

- 10 a) What is simulation? Discuss application of simulation **[7M]**
 b) Minimize $Z=Y_1^2+Y_2^2+Y_3^2$ subjected to $Y_1+Y_2+Y_3=10$ and $Y_1, Y_2, Y_3 \geq 0$ solve using Bellman's principle. **[7M]**

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY **R17**
(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Supplementary Examinations, Dec-21/Jan-22

Power Plant Engineering

(ME)

Roll No									

Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1 a) Explain with neat sketch of Rankine cycle and find out the efficiency of Rankine cycle [7M]
b) A simple Rankine cycle works between pressures 28 bar and 0.06 bar, the initial condition of steam being dry saturated. Calculate the cycle efficiency [7M]

OR

- 2 a) Distinguish between fire tube boiler and water tube boilers [7M]
b) Explain with neat sketch of Cochran boiler [7M]

SECTION-II

- 3 Derive expressions for efficiencies of the following:
i) Diesel cycle [7M]
ii) Otto cycle [7M]

OR

- 4 a) An engine 200 mm bore and 300 mm stroke works on Otto cycle. The clearance volume is 0.0016 m^3 . The initial pressure is 1 bar and the temperature is 300 K. The heat transfer to the air per cycle is 1900 kJ/kg of air. Calculate
i) Thermal efficiency ii) The mean effective pressure [10M]
b) Differentiate between Dual cycle and Brayton cycle [4M]

SECTION-III

- 5 a) Explain with neat sketch of pressurised water reactor [7M]
b) Explain with a neat sketch of CANDU reactor [7M]

OR

- 6 a) Write advantages and disadvantages of Gas-cooled reactor [7M]
b) Briefly explain about Gas-cooled reactor [7M]

SECTION-IV

- 7 a) Write advantages, disadvantages and applications of Hydro-electric plant [7M]
b) Explain about selection of site for a hydro-electric plant [7M]

OR

- 8 a) Explain with neat sketch of impulse turbine and write its advantages [7M]
b) Write applications, advantages and disadvantages of wind power plants [7M]

SECTION-V

- 9 a) Explain briefly the following: [7M]
i) Capital or fixed cost ii) Operational cost
b) Explain the following tariff [7M]
i) Straight meter rate ii) Block meter rate

OR

- 10 a) What is Particulate emission? How is it controlled? [7M]

b)What are the various methods of storage or disposal of radioactive waste materials?

[7M]

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY **R17**

(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Supplementary Examinations, June 2022

Power Plant Engineering

(ME)

Roll No									
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Time: 3 hours

Max. Marks: 70

Answer Any Five Questions

All Questions carries equal marks.

- 1 a) Explain with neat sketch of reaction turbine [7M]
b) differentiate between impulse turbine and reaction turbine [7M]
- 2 a) Explain with neat sketch of low level condenser [7M]
b) explain with neat sketch high level condenser [7M]
- 3 Explain following essential components of Diesel power plant
a) Fuel system [5M]
b) air intake system [5M]
c) common rail injection system and individual pump injection system [4M]
- 4 a) Explain Layout of a Diesel engine power plant system [7M]
b) during a trial of a two stroke diesel engine the following observations were recorded: [7M]
Engine speed=1500rpm, load on brakes=120kg, length of brake arm=875mm.
Determine: (i) Brake torque (ii) Brake power
- 5 a) briefly write about safety measurements of nuclear power plant [7M]
b) write advantages and disadvantages of nuclear power plants [7M]
- 6 a) 200MW of electrical power is required for a city. If this is to be supplied by a nuclear reactor of efficiency 20 percent, using U^{235} as the nuclear fuel, Calculate the amount of fuel required for one days operation. [7M]
b) Write applications, advantages and disadvantages of nuclear power plant [7M]
- 7 Explain the following Tidal power plants
i) Single ebb-cycle system [5M]
ii) single tide-cycle system [5M]
iii) double cycle system [4M]
- 8 a) Explain briefly the following:
i) Load curve [4M]
ii) Load duration curve [3M]
b) List the factors which should be considered while designing a power plant? [7M]

Code No: R17A0327

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Supplementary Examinations, June 2022

Automation and Control Engineering

(ME)

Roll No									
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Time: 3 hours

Max. Marks: 70

Answer Any Five Questions
All Questions carries equal marks.

- 1 a) Define Mechatronics and explain components of Mechatronics with block diagram [7M]
b) Discuss importance of mechatronics in automation [7M]
- 2 a) Explain design and fabrication of automated flow lines [7M]
b) Write applications of Mechatronics [7M]
- 3 a) Explain with neat sketch of photo resistor and write its applications [7M]
b) Explain with neat sketch of photo diode detector and write its applications [7M]
- 4 a) Explain with neat sketch of resistance temperature detector and write its applications [7M]
b) Explain construction and operation of load cell detector and write its applications [7M]
- 5 a) Explain about electro-hydraulic servo system with neat diagram [7M]
b) With the help of neat sketch explain hydraulic and pneumatic system components [7M]
- 6 a) Write characteristics, advantages and disadvantages of mechanical drive system [7M]
b) Explain about pneumatic actuators and write its limitations [7M]
- 7 a) Differentiate between closed loop control system and open loop control system [7M]
b) What is adaptive control and explain about model reference adaptive control [7M]
- 8 a) Explain about Automatic controllers [7M]
b) Differentiate between Hydraulic and pneumatic controllers [7M]

Code No: R17A0331

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Supplementary Examinations, June 2022

Heating, Ventilation and Air Conditioning

(ME)

Roll No									
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Time: 3 hours

Max. Marks: 70

Answer Any Five Questions
All Questions carries equal marks.

Note: Psychometric charts and steam tables are permitted.

- 1 a) Explain with neat sketch of centrifugal compressor and write its industrial applications [7M]
b) Explain the following:
i) single stationary blade type rotary compressor ii) rotating blade type rotary compressor [7M]
- 2 Explain following : [4M]
i) Double tube condenser [3M]
ii) Shell and coil condenser [4M]
iii) Shell and tube condenser [3M]
iv) Tonne of refrigeration
- 3 a) Explain about split air-conditioning system [7M]
b) Differentiate between window air conditioning system and split air conditioning system [7M]
- 4 a) Discuss about ductable package air conditioning system with the help of line diagram [7M]
b) Write advantages and disadvantage of ductable air-conditioning system over a ductable package air conditioning system [7M]
- 5 a) Explain the following: [7M]
i) Sensible Heating ii) Sensible cooling
b) In a heating application, moist air enters a steam heating coil at 10°C, 50% RH and leaves at 30°C. Determine the sensible heat transfer, if mass flow rate of air is 100 kg of dry air per second. Also determine the steam mass flow rate if steam enters saturated at 100°C and condensate leaves at 80°C. [7M]
- 6 The atmospheric air at 30°C dry bulb temperature and 75% relative humidity enters a cooling coil at the rate of 200m³/min. The coil dew point temperature is 14°C and the by-pass factor of the coil is 0.1. Determine i) the temperature of air leaving the cooling coil; ii) the capacity of the cooling coil in tonnes of [14M]

refrigeration and in kilowatt; iii) the amount of water vapour removed per minute; iv) the sensible heat factor for the process

- 7 An air conditioned room that stands on a well ventilated basement measures 3 m wide, 3 m high and 6 m deep. One of the two 3 m walls faces west and contains a double glazed glass window of size 1.5 m by 1.5 m, mounted flush with the wall with no external shading. There are no heat gains through the walls other than the one facing west. Calculate the sensible, latent and total heat gains on the room, room sensible heat factor from the following information. What is the required cooling capacity? Inside conditions: 25⁰ C dry bulb, 50% RH. Outside conditions: 43⁰ C dry bulb, 24⁰C wet bulb. U-value for wall: 1.78 W/m² .K .U-value for roof: 1.316 W/m² .K. U-value for floor: 1.2 W/m² .K .Effective Temp. Difference (ETD) for wall: 25⁰C. Effective Temp. Difference (ETD) for roof: 30⁰ C. U-value for glass ; 3.12 W/m² .K .Solar Heat Gain (SHG) of glass ; 300 W/m² .Internal Shading Coefficient (SC) of glass: 0.86. Occupancy: 4 (90 W sensible heat/person) (40 W latent heat/person) .Lighting load: 33 W/m² of floor area. Appliance load : 600 W (Sensible) + 300 W(latent) .Infiltration : 0.5 Air Changes per Hour Barometric pressure : 101 kPa [14M]
- 8 a) Explain the classifications of water piping system? [7M]
b) Explain about selection of Motor for HP? [7M]

Code No: R17A0328

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Supplementary Examinations, June 2022

Mechanical Measurements and Instrumentation

(ME)

Roll No									
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Time: 3 hours

Max. Marks: 70

Answer Any Five Questions
All Questions carries equal marks.

- 1 (a) Define Error. Give the classification of errors and explain detailed about elimination errors. [7M]
(b) Define transducer. Explain piezo electric transducer with a neat sketch [7M]
- 2 a) What is meant by statistical analysis of random errors? Explain the terms involved in it. [7M]
b) Discuss the classification of measurement system. [7M]
- 3 With the help of a suitable diagram, explain the construction, working and principle features of bourdon tube pressure gauge. [14M]
- 4 Explain the construction and working principle of Ionization pressure gauge. [14M]
- 5 Explain the angular velocity measurement by :
a) AC tachometer [5M]
b) Stroboscope [5M]
c) Photoelectric tachometer [4M]
- 6 Explain the construction and working principle of A.C tachometer with a neat diagram. State its advantage limitations. [14M]
- 7 Explain the working of a sling psychrometer. [14M]
- 8 a) Differentiate between open and closed loop control systems. [7M]
b) Explain the advantages of open loop control. [7M]

Code No: R17A0333

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)

R17

IV B.Tech I Semester Supplementary Examinations, June 2022
Operations Research

(ME)

Roll No									
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Time: 3 hours

Max. Marks: 70

Answer Any Five Questions
All Questions carries equal marks.

- 1 use graphical method to solve the following LP problem: [14M]
Maximize $Z=3x_1+4x_2$ subject to the constraints:
 $2x_1+x_2\leq 40$
 $2x_1+5x_2\leq 180$
 $x_1, x_2\geq 0$

- 2 Food X contains 6 units of Vitamin A per gram and 7 units of Vitamin B per gram and costs of 12 paisa per gram. Food Y contains 8 units of Vitamin A per gram and 12 units of Vitamin B and costs 20 paisa per gram. The daily minimum requirements of Vitamin A and Vitamin B are 100 units and 120 units respectively. Find the minimum cost of product mix. Use simplex method. [14M]

- 3 Obtain IBFS by NWCM for the following transportation problem whose unit costs of transportation, availabilities and requirements are given in the matrices, and then optimize [14M]

Source	Destination				Supply
	1	2	3	4	
1	3	7	6	4	5
2	2	4	3	2	2
3	4	3	8	5	3
Demand	3	3	2	2	10

- 4 a) What is meant by degeneracy in TP.? How do you resolve it? [7M]
b) Explain step by step procedure for Hungarian's method in T.P [7M]

- 5 a) Solve the following game without saddle points [7M]

		Player B	
		2	5
Player A		7	3

- b) use concept of dominance to reduce the size of the matrix of given problem to 2×3 matrix and solve the game [7M]

Player B

	1	8	3
Player A	6	4	5
	0	1	2

- 6 a) Solve the game graphically [7M]

1	3	-1	4	2	-5
-3	5	6	1	2	0

- b) Explain how you can apply linear programming to game theory [7M]

- 7 a) What is selective inventory control? Why do you optimise this in large industries [7M]

- b) Give the classifications of inventories and explain? [7M]

- 8 Different machines can do any of the five required jobs with different profits resulting from each assignment as shown in the adjusting table. Find out maximum profit possible through optimal assignment. [14M]

JOBS	MACHINES				
	A	B	C	D	E
1	30	37	40	28	40
2	40	24	27	21	36
3	40	32	33	30	35
4	25	38	40	36	36
5	29	62	41	34	39

Code No: R17A0329

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Supplementary Examinations, June 2022

Production and Operations Management

(ME)

Roll No									
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Time: 3 hours

Max. Marks: 70

Answer Any Five Questions
All Questions carries equal marks.

- 1 Discuss briefly about process planning and process design? [14M]
- 2 Write a detailed note on production planning and control. [14M]
- 3 Briefly explain the various elements of operations planning and scheduling system. [14M]
- 4 Define Maintenance management and its types. What are the objectives of Maintenance Management? [14M]
- 5 Briefly explain about general principle of forecasting [14M]
- 6 Explain the difference between qualitative methods and quantitative methods [14M]
- 7 What are the inputs and out puts Considered by Material Requirements Planning (MRP) and explain them? [14M]
- 8 What are the types of Material Handling Equipments? What are the Factors affecting during the selection of Material Handling Equipment [14M]

Code No: R17A0326

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Supplementary Examinations, November 2022

Power Plant Engineering

(ME)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1 *A* With a neat sketch explain about Ash Handling System and write its advantages and disadvantage? [7M]
 B Explain about Centrifugal or Cyclone type dust collector with neat sketch? [7M]

OR

- 2 *A* Explain with a neat diagram the working of a Binary Vapour Cycle. [7M]
 B Enumerate various methods of feed water treatment .Explain briefly any one method of Feed water treatment? [7M]

SECTION-II

- 3 *A* Make a neat layout line diagram of Diesel power plant showing in particulars the fuel system and the water cooling system. [7M]
 B What are the advantages and disadvantages of Diesel power plants? And state the application of Diesel power plant? [7M]

OR

- 4 *A* How are Gas turbines plants classified and list the applications of Gas turbine plants? [7M]
 B What are the advantages and disadvantages of a Gas turbine power plant over diesel and Steam power plant of the same capacity? [7M]

SECTION-III

- 5 *A* Describe with the help of a neat sketch the construction of a Pressurized Water Reactor along with merits and demerits? [10M]
 B What is Nuclear fusion? How does it differ from Nuclear fission? [4M]

OR

- 6 *A* What is a Liquid Metal Cooled Reactor? Explain briefly a typical Liquid Metal Reactor with neat sketch? [8M]
 B Write the advantages and disadvantages of a Gas Cooled Reactor? [6M]

SECTION-IV

- 7 *A* How Hydro-Electric power plant classified? Explain a high Head power plant giving its layout clearly. [10M]
 B Explain the construction and working principle of Single Basin Tidal power plant? [4M]

OR

- 8 *A* Describe with the help of a neat sketch the working of a Solar power plant? Write the advantage and disadvantage of the Solar Power Plant? [8M]
 B What is Thermo-Electric effect? Explain with a neat diagram the working of a Thermo-Electric generator? [6M]

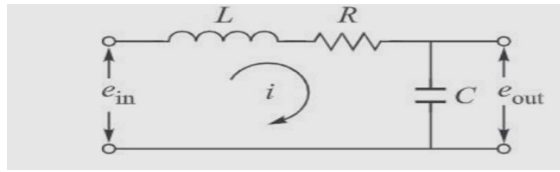
SECTION-V

- 9** **A** What are the various costs involved in power plant economics discussed in detail? **[10M]**
- B** Define the following terms (a) Diversity Factor (b) Load factor **[4M]**

OR

- 10** **A** A generating station has the maximum demand of 30 MW, a load factor is 0.6, a plant capacity of 0.48, and the plant use factor is 0.82. Find (a) The daily energy produced (b) The reverse capacity of the plant (c) The maximum energy that could be produced if the plant were running all the time (d) The maximum energy that could be produced daily, if the plant when running according to the operating schedule were fully loaded. **[8M]**
- B** Describe the various types of waste from a Steam Thermal power plant and the methods for removing the impurities from waste water. **[6M]**
- *****

- 8 *A* Determine the Transfer function for below circuit? [7M]



- B* Explain the Rules for block diagram reduction in detail ? [7M]

SECTION-V

- 9 *A* What is meant by controller? Briefly explain about Process control? [7M]
 B Explain about Automatic controllers in detail? [7M]

OR

- 10 *A* What are the basic control actions in process control ? [7M]
 B What are the advantages and disadvantages of PI controller? [7M]

Code No: R17A0331

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R17

(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Supplementary Examinations, November 2022

Heating Ventilation and Air Conditioning

(ME)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

Note: Steam Tables and Psychrometric charts are permitted

SECTION-I

- 1 A Explain the mechanism of Vapour Compression Refrigeration System with a neat sketch. [7M]
B Explain the working of Thermostatic Expansion valve with a neat sketch [7M]
OR

- 2 A Explain the working of Flooded type evaporator with neat diagram [7M]
B An ammonia refrigeration plant operates between -6.7°C and 26.7°C . The vapor is dry at the end of the compression. Calculate the theoretical COP of the cycle. Use the following properties of ammonia [7M]

Temp ($^{\circ}\text{C}$)	Liquid Enthalpy KJ/Kg	Vapour Enthalpy KJ/Kg	Liquid Entropy KJ/Kg k	Vapour Entropy KJ/Kg k
-6.7	-29.6	1262.36	0.1087	4.7401
26.7	124.56	1291.62	0.4264	4.3263

SECTION-II

- 3 A Describe briefly about the classification of Air conditioning systems. [7M]
B Explain the working of Split A/c System with neat diagram? [7M]
OR

- 4 A Explain with neat sketch working of packaged Air Conditioning System? [7M]
B What are the industrial applications of Air conditioning systems [7M]

SECTION-III

- 5 A Explain about Sensible Heating and Sensible cooling with a neat sketch. [6M]
B The atmospheric air at 30°C Dry bulb temperature and 75% Relative humidity enters a cooling coil at the rate of $200\text{m}^3/\text{min}$. The coil dew point temperature is 14°C and the by-pass factor of the coil is 0.1. Determine: 1. The temperature of air leaving the cooling coil. 2. The capacity of the cooling coil in TR. 3. Sensible heat factor for the process. [8M]

OR

- 6 A Define (i) humidification (ii) Latent Heat (iii) Dew point temperature [6M]
B The atmospheric air at 25°C dry bulb temperature and 12°C wet bulb temperature is flowing at the rate of $100\text{m}^3/\text{min}$ through the duct. The dry saturated steam at 100°C is injected into the air stream at the rate of 72 kg/hr. Calculate the specific humidity and Enthalpy of the leaving air. Determine [8M]

Dry bulb temperature, wet bulb temperature and relative humidity of the leaving air.

SECTION-IV

- 7 A Building consists of 0.5 m X 0.5 m window on the wall facing the wind and an opening of 1.5m X 1.0m on the open window. The center to center distance between windows in the vertical direction is 1.5m. The outdoor temperature is 313K, while the indoor is maintained at 303K. calculate the air flow rate due to the combined effect of wind and stack effects, if the wind blows at a speed of 50Km/hr. [14M]

OR

- 8 *A* Describe the various factors affecting survey of building? [7M]
B Calculate the heat loss through 100 ft² wall with an inside temperature of 65°F and an outside temperature of 35°F. Assume the exterior wall is composed of 2" of material having a 'k' factor of 0.80, and 2" of insulation having a conductance of 0.16. [7M]

SECTION-V

- 9 *A* Describe about hydronic system? [7M]
B Discuss about the fittings used in HVAC piping System? [7M]

OR

- 10 *A* Explain different types of centrifugal fans [6M]
B Give a brief note on the selection of a motor for HP [8M]

Code No: R17A0333

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY **R17**

(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Supplementary Examinations, November 2022

Operations Research

(ME)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1 **A** What are the limitations of linear programming? [4M]
 B Use graphical method to solve the following LP problem [10M]

Maximize $Z = 2x_1 + 3x_2$

subject to

$$x_1 + x_2 \leq 30$$

$$x_2 \geq 3$$

$$0 \leq x_2 \leq 12$$

$$0 \leq x_1 \leq 20$$

$$x_1 - x_2 \geq 0$$

$$x_1, x_2 \geq 0$$

OR

- 2 **A** What is linear programming? What are its assumptions? [4M]
 B Solve the following LP problem using the simplex method. [10M]

Maximize $Z = 3X_1 + 2X_2$

Subject to

$$2X_1 + X_2 \leq 2$$

$$3X_1 + 4X_2 \geq 12$$

$$X_1, X_2 \geq 0$$

SECTION-II

- 3 A manufacturer has distribution centres at Agra, Allahabad and Kolkata. [14M]
 These centres have availability of 40, 20 and 40 units of his product, respectively. His retail outlets at A, B, C, D and E require 25, 10, 20, 30 and 15 respectively. The transportation cost (in rupees) per unit between each centre outlet is given below:

Distribution Centres	Retail Outlets				
	A	B	C	D	E
Agra	55	30	40	50	40

Allahabad	35	30	100	45	60
Kolkata	40	60	95	35	30

Determine the optimal distribution to minimize the cost of transportation.

OR

- 4 A department has five employees with five jobs to be performed. The time (in hours) each men will take to perform each job is given in the effectiveness matrix. [14M]

		Employees				
		I	II	III	IV	V
Jobs	A	10	5	13	15	16
	B	3	9	18	13	6
	C	10	7	2	2	2
	D	7	11	9	7	12
	E	7	9	10	4	12

How should the jobs be allocated, one per employee, so as to minimize the total man-hours?

SECTION-III

- 5 A Explain the graphical method of solving $2 \times n$ and $m \times 2$ games. [6M]
 B In a game of matching coins with two players, suppose A wins one unit of value when there are two heads, wins nothing when there are two tails and losses $\frac{1}{2}$ unit of value when there is one head and one tail. Determine the payoff matrix, the best strategies for each player and the value of the game to A. [8M]

OR

- 6 A Explain the following: [10M]
 i. Two-Person Zero-sum game
 ii. Principles of dominance
 B For what value of λ , the game with following pay-off matrix is strictly determinable? [4M]

		Player B		
		B ₁	B ₂	B ₃
Player A				
A ₁	λ	6	2	
A ₂	-1	λ	-7	
A ₃	-2	4	λ	

SECTION-IV

- 7 Machine A costs Rs 45,000 and the operating costs are estimated at Rs 1,000 for the first year increasing by Rs 10,000 per year in the second and subsequent years. Machine B costs Rs 50,000 and operating costs are Rs 2,000 for the first year, increasing by Rs 4,000 in the second and subsequent years. If we now have a machine of type A, should we replace it with B? If so when? Assume that both machines have no resale value and future costs are not discounted. [14M]

OR

- 8 A What are the costs involved with the inventory? Explain [7M]
 B Soft drinks manufacturing company buys a large number of pallets every year which it uses in the warehousing of its bottled products. A local vendor

has offered the following discount schedule for pallets:

Order quantity	unit price (Rs)
Up to 699	10.00
700 above	9.25

The average yearly replacement is 2400 pallets. The carrying costs are 12% of the average inventory and ordering cost per order Rs.100.

SECTION-V

- 9** Find the sequence that minimizes the total elapsed time required to complete the following tasks on two machines. Also, determine the idle time on Machine I and Machine II. **[14M]**

Task :	A	B	C	D	E	F	G	H	I
Machine I:	2	5	4	9	6	8	7	5	4
Machine II:	6	8	7	4	3	9	3	8	11

OR

- 10** What is simulation? What are its advantages and limitations? **[14M]**

Code No: R17A0329

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY **R17**
(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Supplementary Examinations, November 2022
Production and Operations Management
(ME)

Roll No										
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1 *A* Explain the historic evolution of production and operations management. [7M]
 B Describe the various steps involved in process planning. [7M]

OR

- 2 *A* Define the term ‘Production Planning and Control’. State its objectives. [7M]
 B Differentiate between job-shop, batch and continuous production systems. [7M]

SECTION-II

- 3 *A* What is plant location? Discuss the importance of plant location. [7M]
 B Explain the various factors affecting the plant location. [7M]

OR

- 4 *A* Distinguish between design capacity and system capacity. [7M]
 B What are the objectives of a good plant layout? Explain. [7M]

SECTION-III

- 5 *A* List out various methods of forecasting. Explain any two methods in detail. [7M]
 B Define forecasting. Discuss the applications of forecasting. [7M]

OR

- 6 *A* State and explain the factors affecting forecasting. [7M]
 B What are the common measures of forecast error? Explain. [7M]

SECTION-IV

- 7 *A* Define MRP and describe the various inputs to MRP system. [8M]
 B State the benefits and limitations of MRP. [6M]

OR

- 8 *A* What do you understand by ERP? Explain its main functions. [7M]
 B Explain the methodology adopted in implementing ERP. [7M]

SECTION-V

- 9 *A* Describe briefly the various functions of stores. [7M]
 B Name the various types of records maintained in stores. Explain two of them. [7M]

OR

- 10 *A* Define material handling. State the functions of material handling. [7M]
 B Describe the factors to be considered in material handling problem. [7M]
